

**ABSTRACT**

The invention aims to provide an optical transmission system that specifies such a transmission condition so as to obtain high spectrum efficiency and a large transmission distance-capacity product at the same time, and uses low cost and small sized optical senders and optical receivers, to realize a high density wavelength multiplexing optical transmission. For this purpose, a WDM optical transmission system of the invention has a system structure that specifies by calculation the spectrum efficiency at which the transmission distance-capacity product becomes a maximum value based on the determination of the type of signal light modulation and the assumption of an equation model expressing transmission characteristics of an optical multiplexer and an optical demultiplexer, and optimizes a bit rate and frequency spacing of signal light output from each optical sender, and the transmission characteristics of the optical multiplexer and the optical demultiplexer, so as to approach the spectrum efficiency.